

# INTERNAL AND EXTERNAL CONSTRAINTS ON SAUDI ARABIAN ECONOMIC GROWTH

The role of defense expenditures and  
remittances

*Robert E. Looney*

## Introduction

After nearly twenty-five years of relatively high oil revenues, Saudi Arabia and the other economies of the Gulf States remain overwhelmingly dominated by revenues from this source. In addition, while considerable industrial diversification into non-oil sectors has been achieved, the results have largely been below expectations. Consequently, it is not apparent that the non-oil sectors can sustain growth and development without a steady infusion of government expenditures.<sup>1</sup> Specifically, lower oil prices have resulted in falling state revenues and consequent reduced spending on infrastructure and industry. This, in turn, has exacerbated social unrest. At the same time, increased military spending by Iran and Iraq is also forcing the country to expand its allocations to the military.

On a more fundamental level, it might be argued that beginning in the mid-1980s the decline in oil revenues and their increased instability affected the path of development. For example, Ghamdi presents strong evidence that Saudi government consumption and investment expenditures experienced instability that was positively related to the instability of total revenue.<sup>2</sup> However, the effect was more marked for development expenditure, which supports the view that revenue instability did have an impact on the country's goals of development.

While it does not question this assertion, the research below focuses on a somewhat different issue. That is, has the actual mechanism underlying

economic growth in the kingdom fundamentally changed or has the old model simply run into a period of diminishing returns?

### Overview

During the oil-boom years Saudi Arabia and the other Gulf Cooperation Council (GCC) states' economies were characterized by:

- a lack of binding budgetary constraints, which, in turn, reduced and sometimes even eliminated the need to set spending priorities and allocate scarce economic resources;
- financial resources so large that even with a highly skewed income distribution all sectors of society saw some measure of improvement in their standard of living;
- a situation in which unemployment was unimaginable, since governments showed a seemingly infinite capacity to hire both citizens and foreigners in public jobs.<sup>3</sup>

The oil boom created a lasting legacy, which is now stifling growth and development in the region. It created a parallel escape from politics in which ruling elites rarely faced the need to share power, renew their legitimacy and credibility, or tolerate any meaningful public debate on major economic, social, or political issues such as oil and budgetary policy. It also brought about a system which had neither taxation nor representation. And perhaps the greatest burden imposed by the oil-boom years was an illusion that the oil bonanza would last indefinitely.

All this has resulted in governments being slow to adapt to the new reality of lower revenues. For example, many of the Gulf governments have run chronic deficits averaging well in excess of 5 percent of gross domestic product (GDP), and reaching 15 percent in Saudi Arabia; and budget shortfalls have been almost entirely reflected in the external accounts, leading to large current-account deficits. In addition, external and domestic deficits were initially financed by drawing down the substantial foreign resources accumulated during the 1970s and early 1980s. In fact, with the exception of the United Arab Emirates (UAE), most Gulf countries depleted their assets and turned to borrowing, and, in doing so, for the first time exposed their economies and economic policies to serious international scrutiny. Most of these governments have finally responded by reducing spending; Saudi Arabia has made major reductions in expenditure and increased many fees for services.

### Current problems

The Saudi population is growing rapidly. According to UN projections, population growth will average 3.5 percent per annum until 2002. Some 60

percent of the population is less than 24 years old, and the 15–24 age group is the fastest-growing in the country. Even economic growth of 3.8 percent per annum, as is expected under the new five-year plan, will barely generate enough jobs for a labor force expanding at these rates. In addition, some fear that employment levels could actually fall because of technological advances and increasingly capital-intensive investment. This would leave a rising number of young nationals chasing even fewer jobs.

### Government finance

Public-sector employment has become a means of disguising unemployment, and government jobs are still seen as having high status. Unemployment is also a serious problem. Nevertheless, low oil prices have put increased strain on Saudi government finances. With wages and salaries accounting for almost 50 percent of government spending, rationalization has become unavoidable. However, this is unlikely to mean redundancies. Instead, the government will rely on natural attrition, in combination with a freeze on new recruitment, to cut its wage bill.

### Dependency

Bringing in expatriate workers has been a major factor in Saudi Arabia's economic development. The government now feels that the economic and fiscal costs are growing too fast and without commensurate benefits. Foreign workers are a major burden on the state's finances – like everyone else in Saudi Arabia, they are not liable for income or sales tax. However, they do enjoy free government services, in particular free health care. In addition, foreign workers in the kingdom sent home almost \$16 billion in earnings in 1993, thereby contributing to a current-account deficit of \$14.2 billion (equivalent to around 15 percent of GDP).

The authorities recognize that preventive action is needed if these problems are not to worsen. Thus the new development plan sets out measures to increase job opportunities for Saudi nationals. This may mean restrictions on the recruitment of expatriates into skilled and semi-skilled jobs. The government may also publish "targets" for private-sector companies, while tying government financing to progress on Saudiization. These measures are hardly draconian, and it is clear that pressure on the government to create jobs is less severe than in neighboring countries, where unemployment is more of a problem. Saudi Arabia will therefore persist in its cautious approach to "localization" – the minister of health said recently that it would take at least forty-seven years to get Saudis into only 62 percent of jobs in the Saudi Arabia health sector.

### Saudi Arabian growth patterns

Another way of identifying some of the problems currently facing the Saudi authorities is by examining the changes in several key macroeconomic relationships during the 1980s and into the 1990s. The following points provide a brief overview of these relationships:

- Government investment as a share of non-oil GDP has declined dramatically since 1979, a pattern that also appears to be associated with the government's fiscal deficits.
- On the other hand, private investment has retained a stable share of non-oil GDP, although it is experiencing a slight downward trend.
- The fiscal-deficit share of non-oil GDP peaked in 1987, and after that date stabilized somewhat with regard to its share of non-oil GDP.
- As has its investment, the public sector's consumption has declined with regard to its share of non-oil GDP.
- Also as has investment, government consumption has shown a slight tendency in recent years to increase its share of non-oil GDP.
- Private consumption has also experienced a gradual decline with regard to non-oil GDP. This expenditure category appears to be stabilizing at slightly over 60 percent of non-oil GDP.
- As with consumption and investment, both private- and public-sector expenditures have fallen with regard to the country's non-oil GDP.
- The decline in private-sector expenditures has been more stable, with public-sector expenditures experiencing much greater fluctuation.
- The decline in public-sector expenditures (as indicated by its trend) has also been somewhat sharper than in the case of private expenditures.
- GDP associated with the oil sector has shown the greatest fluctuation of all, falling below non-oil GDP for the first time in 1983. Since that date oil GDP seems to be stabilizing at somewhere between 40 and 60 percent of non-oil GDP.
- Private consumption has consistently accounted for a higher share of GDP than government consumption. However, in recent years this gap has narrowed somewhat.
- On the other hand, government investment and private investment have changed places in accounting for the greatest share of GDP. Up to 1985 government investment had the larger share, private investment had the larger share during most of the rest of the 1980s, with government again taking the larger share in the 1990s.
- Regime expenditure's share of GDP has experienced a downward trend, although this has been reversed in the last several years.
- During the last several years public expenditures have accounted for a larger share of GDP than that associated with private expenditures.

- Of the aggregates examined here, investment has shown the most stability in terms of its share of GDP.
- Capital formation has averaged around 20 percent of GDP and has experienced a very slight downward trend since 1979.
- Consumption has been volatile, although it appears to be stabilizing at around 75 percent of GDP.

While these patterns are valuable in describing certain changes that are taking place in Saudi Arabia, they are of less use in identifying whether the country's economic mechanisms have undergone fundamental alteration. The unanswered question is whether the links between government expenditure, the private sector, and the non-oil economy have changed in a way that alters the effectiveness of the regime's ability to manage the economy.

### Causal links

To answer this question one must satisfactorily address the issue of causation. In this regard, several statistical tests using regression analysis for this purpose are gaining wider acceptance. The original and most widely used causality test was developed by Granger.<sup>4</sup> According to this test, some economic variable such as government investment causes (say) growth in non-oil GDP if rates of expansion in non-oil GDP can be predicted more accurately by past values of government investment than by past rates of growth in non-oil GDP. To be certain that causality runs from government investment to non-oil GDP, past values of government investment must also be more accurate than past values of non-oil GDP in predicting the observed rates of growth in state investment over time.

The results of Granger causality tests depend critically on the choice of lag length. If the chosen lag length is less than the true lag length, the omission of relevant lags can cause bias. If the chosen lag is greater than the true lag length, the inclusion of irrelevant lags causes estimates to be inefficient. While it is possible to choose lag lengths based on preliminary partial autocorrelation methods, there is no a priori reason to assume equal lag lengths for all types of economic activity. To overcome the difficulties noted above, the authors used the Hsiao<sup>5</sup> method to identify the optimal lags.<sup>6</sup>

In our example of government investment and non-oil GDP, several patterns are possible:

- 1 *Government investment causes non-oil GDP* when the prediction error for non-oil GDP decreases when government investment is included in the growth equation. In addition, when non-oil GDP is added to the manufacturing equation the final prediction error should increase.

- 2 *Non-oil GDP growth causes growth in government investment* when the prediction error for non-oil GDP increases when government investment is added to the regression equation for non-oil GDP, and is reduced when non-oil GDP is added to the regression equation for government investment.
- 3 *Feedback* occurs when the final prediction error decreases when government investment is added to the non-oil GDP equation, and the final prediction error decreases when non-oil GDP growth is added to the government investment equation.
- 4 *No relationship* exists when the final prediction error increases both when government investment is added to the non-oil GDP growth equation and when non-oil GDP growth is added to the government investment growth equation.

The data used for the causality tests cover the period 1970–92 (the last year for which comparable data were available); they were from the Saudi Arabian Monetary Agency Annual Reports and were deflated by the non-oil GDP deflator. Causality relationships were examined for the following pairs of variables:

- *Private investment* and (1) non-infrastructure investment, (2) infrastructure investment, (3) defense expenditures, (4) government consumption, (5) private consumption, and (6) non-oil GDP.
- *Non-oil GDP* and (1) non-infrastructure investment, (2) infrastructure investment, (3) defense expenditures, (4) government consumption, and (5) private consumption.

Prior to the actual causality analysis, several tests were performed to determine whether any of the pair of variables had undergone a structural shift during the period examined (1970–92). For most sets of variables a distinct shift in their relationship occurred between 1980 and 1982. The causality tests were therefore performed using the subgroupings 1970–82 and 1980–92.

Summing up, the main questions of interest are as follows:

- What macroeconomic linkages characterize the Saudi economy?
- To what extent have government expenditures provided a positive stimulus to the private sector?
- Have these linkages changed over time?
- Is the private sector evolving in such a way that it may be ready to replace oil-based government expenditure as the engine of growth?
- Is the linkage between public expenditure and private investment strengthening or weakening?
- What are the major implications for future government policy?

### Results

The analysis found a number of interesting relationships for both sets of subperiods. It was found that several patterns characterize the first period (1970–82). Most important for longer run growth is the link between private investment and non-oil GDP. During this period private investment had a positive impact on non-oil GDP. This relationship was not particularly strong, but it did indicate that the private sector's activities were flowing into productive ventures. During this first period it was also found that private investment itself was mainly stimulated by defense expenditures, non-infrastructure investment. Government consumption and infrastructure investment provided considerably less of a stimulus to private investment. In addition, non-oil GDP received its strongest stimulus from government consumption during this period, followed by defense expenditures. Ironically infrastructure investment had a negative impact on the growth in non-oil GDP. In addition, several distinct changes took place during this time. First, and most important, was the severing of the link between private investment and non-oil GDP. Second, non-oil GDP was no longer stimulated by defense expenditures or government consumption. Third, the only macro variable that had a statistically significant link with non-oil GDP was non-infrastructure investment, and this link was rather weak. Fourth, private investment's link with defense expenditures weakened during this period, but was still positive. In contrast, the stimulus provided by government consumption strengthened during this period. On the other hand, the earlier stimulus provided by non-infrastructure investment shifted to a negative impact. Another major change from the earlier period was the shift from private-sector investment affecting private consumption to that of private consumption providing a stimulus to private investment.

A comprehensive explanation of the causes for the apparent shifts in Saudi Arabia's growth mechanism is beyond the scope of this study. However, recent developments in statistical analysis have resulted in the development of new methods (largely cointegration analysis) for identifying the manner in which variables interact over long and short periods.<sup>7</sup> Several of these patterns are suggestive of possible factors that may be affecting the country's growth mechanism. The following sections apply this methodology to two areas often cited as being responsible for many of the kingdom's current economic difficulties, excessive defense expenditures, and the acceleration of remittance payments.

#### Defense expenditures

Defense expenditures in the kingdom account for around one-third of the government's budgetary allocations. While there is no doubt that the country can afford a high level of defense expenditures, the issue here is

whether these allocations come at the expense of economic services, and, if so, whether they reduce the budgetary shares of economic allocations, infrastructure, and the like to the point where imbalances occur. That is, given the country's ongoing needs for infrastructure and other necessary economic services, have defense expenditures skewed the budgetary process away from productivity-enhancing activities?

### Budgetary patterns

The main trends in the country's budgetary shares (see Table 8.1) are as follows:

- There has been a slight increase in the share of the budget allocated to defense. This share increased from slightly over one-quarter of the budget in 1979 to a little over one-third by 1995. It should be noted that this increase has not been linear, but rather reached a peak of over 35 percent in 1988, only to fall to around 31 percent in 1993 and to 33.02 percent in 1995.
- The major expansion in budgetary shares has gone to human resources. This category represented 8.46 percent of the budget in 1979, increasing to nearly 18 percent by 1995.
- Transport and communications have seen their budgetary shares eroded over the years. These allocations accounted for 12.69 percent of the budget in 1980, falling to slightly over 4 percent by 1995. This decline has been fairly constant over time, perhaps reflecting the completion of the major post-oil-boom wave of capital expenditure projects.
- Health expenditures do not show a discernible trend, although they have increased somewhat, from 4.55 percent in 1979 to 6.78 percent in 1995. As with defense expenditures, a peak occurred in the late 1980s, with health reaching 7.65 percent of the budget in 1988.
- Economic resources have declined over time. For the period under consideration, they reached a high of 8.54 percent of the budget in 1980. Since that date they have dropped steadily, reaching 2.57 percent by 1995.
- Infrastructure follows a pattern similar to that of economic resources. A high of 4.68 percent was reached in 1980. Subsequently, the share has fallen, reaching 0.93 percent in 1995.
- Municipal services have also declined over time, although again the trend has not been strictly linear. Starting at 5.88 percent of the budget in 1979, allocations to the municipalities increased to 8.82 percent in 1981. Since that time there has been a generally downward trend, with the budgetary share reaching 3.26 percent by 1995.
- Government lending has fallen dramatically over time. In 1979 this category received 11.46 percent of the budget. By 1995 the share allo-



cated for this activity was only 0.32 percent of the budget. The decline in this activity was most rapid in the 1980s, with budgetary shares falling to 0.42 percent by 1988.

- The share of resources allocated for local subsidies has fluctuated over time, with a high of around 4.65 percent in 1993 and a low of 2.02 percent in 1980.
- Administration has seen its share increase over time. From a low of 14.23 percent in 1982, allocations to this activity reached 29.54 percent in 1993, only to fall to 26.48 by 1995.

### Previous studies

On the surface, budgetary tradeoffs between defense and allocations to socioeconomic programs would seem to be straightforward. That is, a given budgetary increase in military expenditures will crowd out an equivalent amount of all other spending and these programs will be reduced according to their proportion of the total. However, recent research has shown this view of the budgetary process to be simplistic and not in conformance with the manner in which governments often choose to prioritize expenditures.<sup>8</sup>

A related issue, and one of significant relevance for the Saudi authorities facing austerity programs, is the manner in which austerity-driven budgetary cuts are allocated. Anecdotal evidence suggests that officials often follow rather ad hoc rules for making large contractions in a short time, cutting new rather than ongoing projects, new rather than existing employment, and materials and travel expenses rather than personnel; and favoring ministries that are politically powerful or reducing those that expanded most rapidly in the past.

In the classic study of relative vulnerability to budgetary cuts, Hicks and Kubisch examined thirty-seven cases of budgetary reduction. These were defined as occurring in countries where real expenditure declined in one or more years. Hicks and Kubisch's main findings indicated that the countries examined experienced an average decline of 13 percent in real government expenditure. Associated with this decline was a contraction of only 5 percent in the social sectors (producing a vulnerability index of 0.4). By contrast, the index was 0.6 for the administrative/defense sectors and over 1 percent for production and infrastructure. In short, the various social sectors were less vulnerable to cuts than defense and administration, which in turn were considerably less vulnerable than production and infrastructure.<sup>9</sup> This finding was contrary to the prevailing view of the time.

The fact that social sectors and defense were both relatively protected suggests that there were high political costs associated with reducing them. Countries appeared to have been more willing to cut spending on infrastructure and production, which, of course, is likely to have adverse

Table 8.1 Saudi Arabia: budgetary shares (%), 1979-95

<i>Year</i>	<i>Defense</i>	<i>Human resources</i>	<i>Transport and communications</i>	<i>Health</i>	<i>Economic resources</i>
1979	26.12	8.46	11.31	4.55	6.89
1980	27.27	8.94	12.69	4.88	8.54
1981	27.70	8.81	11.86	4.60	7.61
1982	29.64	10.10	10.38	5.43	7.03
1983	29.06	10.67	9.60	5.23	5.08
1984	30.73	11.70	8.53	6.21	4.82
1985	31.98	12.27	7.25	6.45	4.54
1986	32.86	13.41	7.06	6.67	4.36
1987	33.97	14.84	6.83	6.95	4.14
1988	35.47	16.56	6.72	7.65	4.17
1989	34.04	17.09	6.06	7.57	3.59
1990	34.27	15.56	4.84	6.81	2.55
1991	34.27	15.56	4.84	6.81	2.55
1992	31.81	17.59	4.67	7.52	2.55
1993	31.32	16.31	4.16	6.92	2.57
1994	33.47	18.27	4.28	7.04	2.68
1995	33.02	17.95	4.08	6.78	2.57

  

<i>Year</i>	<i>Infrastructure</i>	<i>Municipal services</i>	<i>Government lending</i>	<i>Local subsidies</i>	<i>Administration</i>
1979	3.13	5.88	11.46	4.16	18.04
1980	4.68	7.81	7.71	2.02	15.45
1981	4.74	8.82	8.34	3.05	14.47
1982	3.73	8.37	7.46	3.56	14.23
1983	3.68	7.33	7.69	3.49	18.16
1984	3.78	6.56	6.73	4.05	16.90
1985	3.46	5.95	4.65	4.17	19.29
1986	3.12	5.56	3.58	4.03	19.34
1987	2.69	5.08	2.25	3.85	19.40
1988	2.51	4.97	0.42	3.77	17.75
1989	1.99	3.87	0.01	3.47	22.32
1990	1.36	3.30	0.59	2.79	27.92
1991	1.36	3.30	0.59	2.79	27.92
1992	1.15	3.27	0.36	3.92	27.16
1993	1.05	3.11	0.36	4.65	29.54
1994	0.90	3.27	0.33	4.36	25.33
1995	0.93	3.26	0.32	4.61	26.48

Source: Saudi Arabian Monetary Agency Annual Report, July, 1996.

implications for longer-term growth but few early direct and immediate costs.

Summing up these findings, Hicks and Kubisch found that when faced with difficult choices in reducing public expenditures governments consider a wide range of factors, including political and economic costs, present versus future consumption, and the potential impact on employment, distri-

bution, and welfare. Their empirical results suggest that when governments in developing countries implement austerity programs they do not apply across-the-board reductions in expenditures. Generally, capital expenditures are reduced more than recurrent expenditure. Within both capital and current budgets, the social and administrative/defense sector appears to be relatively protected, while infrastructure and production absorb disproportionately larger reductions. That the social sector does not appear to be highly vulnerable to expenditure reductions in times of austerity was the novel finding of that study.

Throughout most of the 1980s and into the 1990s Saudi Arabia experienced a period of relative fiscal austerity. Falling oil revenues forced a number of significant budgetary cutbacks. Of particular interest is the manner in which the authorities set priorities. Did expenditure on certain categories vary systematically with unanticipated changes in revenue? If so, which sectors gained and which lost?

One way of gaining an insight into these issues is to examine the manner in which, in light of revenue developments during the fiscal year, the Saudi government revised its allocation to the major budgetary categories. Did expenditure on certain categories vary systematically with unanticipated changes in revenue? If so which sectors gained and which lost? Do these patterns provide insights into the manner in which the government established budgetary priorities during this period?

While it did not look directly at linkages with defense expenditures, an analysis of the 1979–88 period found the following:

- Human resource development and health and social development allocations were the only budgetary categories to have their budgetary shares increase with expanded, unanticipated deficits. They were also the only sectors to have their budgetary shares increase during periods of increased actual (realized) budgetary deficits.
- Human resource development and health did not have their budgetary shares expanded with increases in expected revenue. This finding is consistent with the notion that, because of their high priority, their funding levels were assured. Given this, marginal increases in revenue could be safely used by the authorities to fund lower-priority projects.
- The deficit-related expansion in human capital seems to have come in part at the expense of longer-term investment in economic capacity. Specifically, transportation and communications, economic services, and infrastructure had their budgetary shares contracted during periods of increased unexpected and actual deficits.<sup>10</sup> This finding is consistent with that of Hicks and Kubisch, who document the vulnerability of capital formation during periods of austerity.<sup>11</sup>

In general, the main findings of this study confirm the high priority

granted to human resource development by the Saudi authorities. Resources in this sector have been preserved relative to other sectors during the current period of austerity. Budgetary cuts have occurred in Saudi Arabia, but education has been relatively spared. The long-term nature of the commitment by the government to this sector is also evidenced by the fact that it appears to be relatively safe from budgetary cuts during periods of budgetary deficit. In fact, deficits may owe their size to the authorities' commitment to providing adequate funding for these programs. The same could be said of health and social expenditures.

From this analysis one can conclude that, while defense has retained its leading share of the budget during the recent period of relative fiscal austerity, Saudi Arabia does not appear to have fallen into the guns-versus-education syndrome. In fact, the two types of expenditure appear to complement each other in the minds of the Saudi budgetary authorities. The country appears firmly committed to its responsibility of providing educational and occupational opportunities to the majority of its citizens.

### Methodology

To see whether these conclusions held up, defense was explicitly introduced into the analysis the interaction of defense with other budgetary shares, and this was assessed by use of cointegration analysis. Specifically, to shed light on these issues a vector error-correction model was used. If there is evidence of cointegration between two variables – i.e. they move in a similar pattern over time – then an error-correction representation of the dynamic relationship between the two variables allows for incorporation of the long-run (or low-frequency) movements contained in their cointegrating equation. More specifically, if two variables  $X_t$  and  $Y_t$  are cointegrated, then the current change in  $X_t$ , for example, reflects not only lagged changes in  $Y_t$  but also lagged levels of  $Y_t$ . In other words, part of the short-run change in  $X_t$  reflects an adjustment that brings it into alignment with the trend value of  $Y_t$ .

The Saudi Arabian Monetary Authority's Annual Report breaks down the government's main expenditure items into defense and security, human resource development, transport and communications, economic resource development, health and social development, infrastructure development, municipal services, government lending institutions, local subsidies, and administration.

To assess the manner in which defense expenditures interact with these budgetary items two sets of cointegration analysis were performed: in the first set the non-defense shares were set as the dependent variable, with defense the independent term; and in the second set defense and non-defense were reversed, with defense the dependent variable. Here cointegration is identified by the statistical significance of the error-correction coefficient.

Specifically, a statistically significant coefficient of an error-correction term indicates that part of the short-term change in the value of the left-hand side (dependent) variable reflects an adjustment toward the long-run relationship given by the cointegrating relation and thus provides an indirect test of cointegration. A related point to note is that when two variables are cointegrated Granger causality necessarily exists in at least one direction.<sup>12</sup>

### Results

Through this analysis several interesting patterns emerge (see Table 8.2):

- Defense and human resources are not cointegrated. That is there is no long-run link between their budgetary shares. On the other hand, increases in either produce a short-run increase in the other. In this sense, defense expenditures do not come at the expense of human resource development.
- Somewhat surprisingly, no statistically significant patterns were found between defense and transport/communications.
- Health services and defense experience the most complex set of relationships. These budgetary shares are highly cointegrated. Because the error-correction term is significant for both defense on health and health on defense, it is apparent that the burden on adjustment to correct deviations from the cointegrating relation is borne by both variables. In other words, both variables respond to changes in the other. It should be noted, however, that the short-run adjustment of health to changes in defense is positive, while the defense share of the budget contracts upon increases in health expenditure. In long-run equilibrium however, each variable has a positive relationship with the other.
- Adjustments in economic services occur largely in response to movements in defense expenditures. While this short-run adjustment may be positive, with increased defense resulting in expanded economic services, the long-run pattern is clearly negative. The same pattern characterizes the relationship between infrastructure and defense. In addition, in both cases it is apparent that movements in economic services or infrastructure do not affect the share of the budget allocated to defense.
- The share of the budget allocated to municipal services is also negatively affected in the long term by expanded defense expenditures. The reverse is also the case. In the short run, however, these patterns are not predictable enough to be statistically significant.
- Government allocations to lending institutions suffer at the expense of defense expenditures, with negative adjustments to increased defense expenditures occurring in the short and long run.

Table 8.2 Saudi Arabia: cointegration test for long-run defense/budgetary expenditure equilibrium, 1979-95

Budget category	Error-correction coefficients		Long-term coefficients		Short-run impact	
	Dependent variable non-defense (defense)		Dependent variable non-defense (defense)		Dependent variable non-defense (defense)	
Human resources	-0.17 (-0.97)	-0.59 (-2.18)	2.61 (1.36)	0.37 (1.73)	+	+
Transport and communications	-0.13 (-1.97)	-0.34 (-1.48)	0.21 (0.32)	-0.10 (-0.14)	ins	ins
Health services	-1.05 (-4.60)	-1.52 (-6.07)	0.39 (6.40)	2.49 (13.11)	+	-
Economic services	-0.98 (3.37)	-0.80 (-1.45)	-0.29 (-3.69)	-1.14 (-0.88)	+	ins
Infrastructure	-0.21 (-3.81)	-0.28 (-1.71)	-0.71 (-4.34)	0.50 (0.27)	+	ins
Municipal services	-0.29 (-4.54)	-1.39 (-2.36)	-0.32 (-2.16)	-1.31 (-4.75)	ins	ins
Lending institutions	-0.31 (-4.69)	-0.11 (-0.73)	-1.73 (-5.41)	0.43 (0.23)	-	ins
Subsidies	-0.13 (-0.25)	-1.15 (-3.11)	-1.54 (-0.22)	4.00 (3.69)	ins	-
Administration	-1.09 (-1.98)	0.07 (-0.33)	0.81 (2.45)	4.47 (0.37)	-	-

Note: Cointegration analysis using Pesaran's ADFL estimation method. See Pesaran and Pesaran (1997) for the specific computational methods used. Augmented Dickey-Fuller tests indicated that the budgetary shares all have unit root, i.e. they are non-stationary. Brackets indicate t-statistics.

- Increased local subsidies are not affected by allocations to defense. However, increases in this budgetary category produce contractions in the defense share of the budget. This occurs in both the short and longer term.
- Finally, defense and public administration are weakly cointegrated, with increased defense producing short-run declines in administration. However, in the longer term expanded defense expenditures produce a corresponding increase in the share of the budget allocated to administration.

Several of these budgetary links with defense can best be illustrated by means of variance decomposition analysis. Here we are interested in the percent of the variance of one variable that is caused by movements in the other. Because the variables are cointegrated, we can again use the vector error-correction form of autoregression to assess the response of one variable to movements in the other.

The case of defense and allocations to the economy can be illustrated by applying this analysis to infrastructure. If we produce an increase in the share of the budget allocated to infrastructure, only marginal changes occur in defense. In fact, after ten periods, past values of defense still explain over 99 percent of the variance of that category's budgetary share (see the top of Table 8.3). On the other hand, after ten periods, increases in defense account for nearly 95 percent of the variance in the share of infrastructure in the government's budget (see the bottom of Table 8.3).

In the case of subsidies (see Table 8.4) it is clear that the government's program of local allocations has a great effect on the variance of defense expenditures. The reverse is not the case. Finally, and as has been noted, health and defense tend to affect each other over time, with the variance decomposition analysis suggesting (see Table 8.5) that this effect is slightly stronger from health to defense than vice versa.

The general pattern that emerges from these results is one whereby movements in defense largely control the adjustment of other major budgetary shares. This movement tends to be positive in the short run for both economic and human services. However, in the longer term increased defense expenditures largely come at the expense of allocations to the economy. Areas such as human resource development and health services do not suffer over time from expanded defense budgets. The effect of subsidies on defense is interesting in that it suggests that some groups in Saudi Arabia not only are powerful enough to preserve their payments, but can do so over long periods of time and at the expense of allocations to the defense sector.

As noted in Table 8.1, this conclusion must be tempered by the fact that defense still accounts for about one-third of the budget, while subsidies' share of the budget in 1995 was only 4.6 percent. Still, given the

Table 8.3 Variance decomposition tests: defense and infrastructure development

<i>Period</i>	<i>Standard error</i>	<i>Defense</i>	<i>Infrastructure</i>
Order of VAR: defense, infrastructure			
Variance decomposition of defense			
1	1.210373	100.0000	0.000000
2	1.592280	99.99451	0.005490
3	1.858997	99.97874	0.021263
4	1.991127	99.96981	0.030194
5	2.060697	99.92916	0.070839
6	2.104976	99.89574	0.104258
7	2.138600	99.85250	0.147495
8	2.166637	99.79643	0.203566
9	2.193102	99.74651	0.253488
10	2.219813	99.70274	0.297257
<i>Period</i>	<i>Standard error</i>	<i>Infrastructure</i>	<i>Defense</i>
Order of VAR: infrastructure, defense			
Variance decomposition of infrastructure			
1	0.095535	100.0000	0.000000
2	0.121083	85.44301	14.55699
3	0.211637	28.53682	71.46318
4	0.298819	15.92498	84.07502
5	0.366433	12.08405	87.91595
6	0.432114	9.186759	90.81324
7	0.493746	7.427277	92.57272
8	0.545832	6.533074	93.46693
9	0.592266	5.896355	94.10365
10	0.635879	5.385884	94.61412

*Note:* The method of computation is vector error-correction autoregression with response standard errors calculated through 100 Monte Carlo repetitions.

improvement in private investment productivity usually associated with infrastructure and other economic services, the negative impact that defense has had on allocations must bear some of the responsibility for the weakening of the link between private-sector investment and the non-oil economy.

### Remittances

The outflow of private transfers, which includes workers' remittances, is a significant contributor to the kingdom's current payments imbalance. The number of overseas residents in the kingdom is estimated at 5–6 million,



Table 8.4 Variance decomposition tests: defense and subsidies

<i>Period</i>	<i>Standard error</i>	<i>Defense</i>	<i>Subsidies</i>
Order of VAR: defense, subsidies			
Variance decomposition of defense			
1	0.610945	100.0000	0.000000
2	0.615594	98.69332	1.306680
3	0.755057	74.79622	25.20378
4	1.202869	43.74147	56.25853
5	1.578888	39.56225	60.43775
6	1.860501	36.84978	63.15022
7	2.099617	35.04899	64.95101
8	2.303546	34.28269	65.71731
9	2.489484	33.58054	66.41946
10	2.665479	33.04865	66.95135
<i>Period</i>	<i>Standard error</i>	<i>Subsidies</i>	<i>Defense</i>
Order of VAR: subsidies, defense			
Variance decomposition of subsidies			
1	0.406278	100.0000	0.000000
2	0.644648	99.98496	0.015037
3	0.767561	99.93678	0.063218
4	0.835379	99.88671	0.113289
5	0.885087	99.84580	0.154199
6	0.931314	99.81339	0.186610
7	0.977380	99.78978	0.210221
8	1.022679	99.77119	0.228810
9	1.066380	99.75530	0.244700
10	1.108243	99.74172	0.258280

*Notes:* The method of computation is vector-error correction autoregression with response standard errors calculated through 100 Monte Carlo repetitions.

and in 1994 net private transfers were recorded at \$15 billion, compared with a current-account deficit of \$9.1 billion.<sup>13</sup>

Clearly the Saudi authorities are looking closely at ways to reduce the hard-currency outflows associated with the large expatriate community. The Riyadh Chamber of Commerce and Industry is conducting a study on opening up investment opportunities for expatriates so that some of the money now remitted would remain inside the kingdom. The study's recommendations include permitting non-Saudis to invest in the stock market – at present only GCC nationals can invest – and real estate. (Foreigners are able to invest in mutual funds offered by the local commercial banks.) Although other policies may push up remittances, it is not clear whether these changes would result in a sizable reduction in the outflow of expatriate

Table 8.5 Variance decomposition tests: defense and health

<i>Period</i>	<i>Standard error</i>	<i>Defense</i>	<i>Health</i>
Order of VAR: defense, health			
Variance decomposition of defense			
1	0.949598	100.0000	0.000000
2	1.118723	99.87266	0.127341
3	1.223944	89.48703	10.51297
4	1.280562	84.66337	15.33663
5	1.318006	85.19339	14.80661
6	1.348875	85.82303	14.17697
7	1.366369	85.53605	14.46395
8	1.378418	84.94050	15.05950
9	1.386237	84.85715	15.14285
10	1.392367	84.93275	15.06725
<i>Period</i>	<i>Standard error</i>	<i>Defense</i>	<i>Health</i>
Order of VAR: health, defense			
Variance decomposition of health			
1	0.360179	100.0000	0.000000
2	0.389988	97.95515	2.044851
3	0.426058	92.94083	7.059167
4	0.447312	92.60774	7.392260
5	0.460546	92.69930	7.300704
6	0.463896	91.50271	8.497292
7	0.466818	90.40560	9.594396
8	0.467884	90.17850	9.821503
9	0.468599	89.90679	10.09321
10	0.471018	89.32616	10.67384

*Notes:* The method of computation is vector-error correction autoregression with response standard errors calculated through 100 Monte Carlo repetitions.

earnings. Many workers would probably continue to remit a substantial proportion of their earnings home, as in many cases this is the principal source of income for their families and their sole reason for working in Saudi Arabia. Moreover, the tightening of some of the regulations on the expatriate community is likely to increase the outflow of workers' remittances. For example, the newly enforced order that embassy schools cannot enroll children beyond the age of 16 is expected to increase remittances, because the families of many workers will be forced to return home for their children's schooling, thereby requiring workers remaining in the kingdom to remit more money to their families.

The recent increase in remittances is even more striking when compared to the pattern of investment in the kingdom (see Table 8.6). As a share of GDP,

remittances increased from 3.75 percent in 1971 to slightly over 15 percent by 1994. Starting out at a slightly higher figure of 4.56 percent in 1971, private investment increased to only 11.47 percent by 1994. While showing no discernible trend, government investment started the period (1971) at 5.10 percent of GDP, only to finish at 5.33 percent. These patterns are even more dramatic when viewed as shares of non-oil GDP. From a low of 4.87 percent in 1975, remittances had increased to nearly 24 percent by 1994. In contrast, government investment declined from a high of 45.75 percent in 1978 to 8.43 percent in 1994. The share of private investment was much more stable, falling from a high of 24.4 percent in 1977 to 18.19 percent in 1994.

To determine the extent to which remittances interact with investment in the kingdom an analysis was undertaken similar to that performed above on budgetary shares. Here we are especially interested in determining whether

Table 8.6 Private investment and remittances, 1971-94

Year	Share of GDP			Share of non-oil GDP		
	Remittances	Government investment	Private investment	Remittances	Government investment	Private investment
1971	3.75	5.10	4.56	11.53	17.71	14.05
1972	3.93	4.89	4.11	13.97	17.41	14.64
1973	3.86	3.43	2.36	24.84	22.14	15.23
1974	1.85	5.27	4.77	9.18	26.20	23.71
1975	1.40	10.63	6.45	4.87	36.96	22.72
1976	2.12	13.33	8.06	6.42	40.40	24.40
1977	2.57	17.96	8.14	6.44	45.04	20.41
1978	4.18	19.65	7.77	9.73	45.72	18.09
1979	5.08	15.97	6.02	14.97	47.06	17.30
1980	3.53	20.85	8.94	7.20	42.52	18.24
1981	3.51	14.08	6.82	9.99	40.09	19.44
1982	3.50	15.99	8.22	7.07	32.32	16.63
1983	4.41	13.45	11.10	7.79	23.77	19.64
1984	5.38	13.18	11.56	8.79	21.55	18.91
1985	6.04	10.44	11.22	8.90	15.38	16.54
1986	6.64	9.28	11.81	8.98	12.56	15.99
1987	6.71	9.95	11.27	9.17	13.59	15.40
1988	8.55	8.43	11.09	11.73	11.56	15.22
1989	10.29	8.46	10.48	14.99	12.32	15.27
1990	10.73	10.84	6.90	17.63	17.81	11.35
1991	11.65	10.22	8.32	19.25	16.89	13.75
1992	10.87	6.99	11.85	18.87	12.14	20.57
1993	13.26	6.76	13.61	21.30	10.87	21.87
1994	15.06	5.33	11.47	23.86	8.43	18.19

Sources: Investment: Thirty-Second Annual Report, Saudi Arabian Monetary Agency, Riyadh, 1996; Remittances: World Development Indicators, World Bank, Washington, 1997.

any long-run patterns exist between remittances and investment. Similarly, if these patterns exist, what is the nature of the short-run adjustment process that occurs to restore stability after a change in one of the variables. As with the budgetary analysis, several patterns emerged. Looking at the impact of remittances on investment (see Tables 8.7 and 8.8) and based on the statistical significance of the error-correction term (Ecmt-1), it is apparent<sup>14</sup> that private investment (both actual and anticipated) and remittances are cointegrated – that is, they form a close long-run association (Table 8.7). While the long-run pattern is one of increased remittances being associated with

*Table 8.7* Impact of remittances on investment: full information estimate of error-correction model

<i>Exogenous variables</i>	<i>Private investment</i>	<i>Anticipated private investment</i>	<i>Total public investment</i>	<i>Public infrastructure investment</i>	<i>Public non-infrastructure investment</i>
Constant	1.92 (2.74)	1.36 (2.18)	4.22 (5.01)	3.00 (4.03)	0.56 (1.08)
Ecmt-1	-0.49 (-3.60)	-0.37 (-2.74)	-0.38 (-4.79)	-0.32 (-3.98)	-0.51 (-2.68)
D investment-1			0.24 (1.48)	0.38 (2.22)	
Dt-2			-0.04 (-0.22)	0.02 (0.10)	
Dt-3			0.57 (3.35)	0.50 (2.65)	
D remittances	-0.23 (-1.05)	-0.11 (-0.55)	0.44 (1.86)	-0.16 (-0.61)	0.57 (1.71)
Dt-1	-0.50 (-2.20)	-0.56 (-2.55)	0.75 (2.28)	0.63 (2.50)	
Dt-2		-0.48 (-2.44)	0.70 (2.45)		
Dt-3			0.36 (1.43)		
Long-run coefficient	0.67 (3.37)	0.94 (2.92)	-1.66 (-3.83)	-0.78 (-2.22)	-0.42 (-1.72)
R2	0.47	0.537	0.85	0.76	0.41
DW	1.66	2.05	2.31	2.02	2.10
F	4.52	4.06	7.65	6.41	5.67

*Notes:*

Dependent variable = measure of investment; ( ) = *t* statistic.

Error-correction parameters and long-run coefficients computed using Pesaran's ADRL estimation method. See Pesaran and Pesaran (1997) for the specific computational methods used.

higher levels of private investment, short-run increases in remittances have a dampening (the negative sign on the D remittances term) impact on private investment.

In contrast, private investment remittances and government investment (both for infrastructure and non-infrastructure) form a long-run negative relationship. That is, increases in remittances and public investment form a long-run pattern whereby government allocations to capital formation have contracted over time with expanded remittances.

While the pattern of remittances has influenced investment in the kingdom, the reverse is not true (see Table 8.8). Both private and public investments have had a negligible impact on the long-run pattern of shorter-run adjustments in the country's remittances. This result is surprising in that one might expect that both private and public investment would respond to increased domestic economic activity and would thus be associated with remittances which also reflect that activity.

A somewhat different pattern was found when both remittances and investment were expressed as shares of non-oil GDP (see Table 8.9). The

Table 8.8 Impact of investment on remittances: full information estimate of error-correction model

Exogenous variables	Private investment	Anticipated private investment	Total public investment	Public infrastructure investment	Public non-infrastructure investment
Constant	0.39 (0.44)	-0.11 (-0.13)	0.49 (0.62)	0.85 (1.24)	-0.01 (-0.02)
Ecmt-1	0.09 (0.74)	0.04 (0.34)	0.04 (0.48)	0.03 (0.44)	0.11 (1.32)
D investment	-0.04 (-0.25)	0.07 (0.40)	-0.03 (-0.43)	-0.07 (-1.11)	0.19 (1.38)
Dt-1					
D remittances					
Dt-1					
Dt-2					
Long-run coefficient	0.56 (0.31)	-1.95 (-0.20)	0.71 (0.26)	2.14 (0.37)	-1.66 (-1.25)
R2	0.04	0.04	0.05	0.10	0.13
DW	2.63	2.50	2.57	2.59	2.64
F	0.34	0.38	0.40	0.95	1.31

Notes:

Dependent variable = remittances.

Error-correction parameters and long run coefficients computed using Pesaran's ADRL estimation method. See Pesaran and Pesaran (1997) for the specific computational methods used.

share of remittances in non-oil GDP does not form a long-run equilibrium with private investment as a share of non-oil GDP. However, increased remittances do cause a fairly sharp fall in the private investment/non-oil GDP ratio. Again, changes in private investment do not have a corresponding effect on remittances. When expressed as shares of non-oil GDP, public investment and remittances move together and form a long-run relationship. This relationship is negative, with increased remittances reducing government investment. All of this adjustment occurs through the error-correction term.

*Table 8.9* Remittances and investment shares of non-oil GDP: full information estimate of error-correction model (shares of non-oil GDP)

<i>Exogenous variables</i>	<i>Remittances/private investment</i>		<i>Remittances/public investment</i>	
	<i>Dependent variable</i>		<i>Dependent variable</i>	
	<i>Private investment</i>	<i>Remittances</i>	<i>Public Investment</i>	<i>Remittances</i>
Constant	-8.55 (-1.15)	4.83 (1.02)	11.92 (2.60)	3.61 (1.20)
Ecmt-1	-0.08 (-0.31)	-0.04 (-0.32)	-0.29 (-2.93)	-0.11 (-0.69)
D investment		-0.20 (-0.87)		-0.06 (-1.06)
Dt-1	-0.79 (-2.28)		0.27 (1.29)	
Dt-2	-1.04 (-2.98)		0.37 (1.69)	
Dt-3	-0.67 (-2.44)		0.46 (1.77)	
D remittances	0.15 (0.10)		-0.41 (-2.13)	
Dt-1	-1.24 (-3.09)			
Dt-2	-0.88 (-3.54)			
Dt-3	-0.36 (-2.20)			
Long-run coefficient	0.66 (0.89)	-4.77 (-0.32)	-1.43 (-2.96)	-0.53 (-0.81)

*Notes:*

Dependent variable = remittances.

Error-correction parameters and long-run coefficients computed using Pesaran's ADRL estimation method. See Pesaran and Pesaran (1997) for the specific computational methods used.

### Conclusions

For Saudi Arabia, the syndrome of sudden affluence in the 1970s was made possible by an economic order based on unearned income. Specifically, the economic link between production and consumption was severed, while the government assumed the role of provider, establishing an elaborate welfare state and thus securing its role. As long as money was available to lubricate the economy, the system worked smoothly for over a decade or so. Even into the 1980s, with the transformation of the physical landscape progressing at high speed – with the building of an industrial infrastructure, hospitals, and utilities – the social and political structures were fixed and secured. Clearly, without the constant flow of funds through the elaborate income distribution networks, most of the status quo is unsustainable. It is no longer possible to cover up structural weaknesses and policy inconsistencies.<sup>15</sup>

In sum, the old system has run into diminishing returns and is no longer capable of sustaining high rates of economic growth. In particular, the breaking of the link between private investment and non-oil GDP appears to be the critical structural change occurring in recent years. Clearly, identification of the precise mechanisms through which the break occurred should be a high priority for future research. As for the present, one can only speculate as to the causes of this development, although several patterns associated with defense expenditures and remittances may provide a partial explanation. In particular, both defense expenditures and remittances appear to have reduced the provision of government expenditures – economic services, infrastructure, public investment – that ordinarily enhance the productivity of private investment. One can conclude that this also carries over to the quality of those services. In addition, increased remittances appear to depress private-sector investment in the short term. The effects associated with remittances and defense expenditures are therefore consistent with the observed decline in the effectiveness of private-sector investment in expanding non-oil GDP.

### Notes

- 1 See Robert E. Looney's works, "A post-Keynesian assessment of alternative Saudi Arabian austerity strategies," *Kuwait University Journal of the Social Sciences*, vol. 23, no. 3, autumn, 1995, pp. 251–73; "Real or illusory growth in an oil-based economy: government expenditures and private sector investment in Saudi Arabia," *World Development*, vol. 20, 1992, pp. 1367–76; "Oil revenues and viable development: impact of the Dutch disease on Saudi diversification efforts," *American Arab Affairs*, no. 27, 1989, pp. 29–36; "Saudi Arabia's development strategy: comparative advantage versus sustainable growth," *Orient*, vol. 30, 1989, pp. 75–96.
- 2 A.M.A. Ghamdi, "Economic development and revenue instability: the Saudi experience," *METU Studies in Development*, vol. 19, no. 1, 1992, pp. 67–80.

- 3 M.H. Nagi, "Development with unlimited supplies of capital: the case of OPEC," *Developing Economies*, vol. XX, 1982, pp. 1-19; H. Beblawi and G. Luciani, *The Rentier State*, Croom Helm, London, 1987; Vahan Zanoian, "After the oil boom," *Foreign Affairs*, vol. 74, no. 6, November/December, 1995, pp. 2-7; and K.A. Chaudhry's related works, "The price of wealth: business and state in labor remittance and oil economies," *International Organization*, vol. 43, 1989, pp. 101-46, and *The Price of Wealth: Economies and Institutions in the Middle East*, Cornell University Press, Ithaca, New York, 1987.
- 4 C.W.J. Granger, "Some recent developments in a concept of causality," *Journal of Econometrics*, vol. 39, 1988, pp. 199-211; and "Investigating causal relations by econometric models and cross-spectral methods," *Econometrica*, vol. 37, 1969, pp. 424-38.
- 5 C. Hsiao, "Autoregressive modeling and money-income causality detection," *Journal of Monetary Economics*, 1981, pp. 85-106.
- 6 D.L. Thornton and D.S. Batten, "Lag-length selection and tests of Granger causality between money and income," *Journal of Money, Credit and Banking*, 1985, pp. 164-78.
- 7 W.W. Charemza and D.F. Deadman, *New Directions in Econometric Practice: General to Specific Modelling, Cointegration and Vector Autoregression*, Aldershot, Hants, Edward Elgar, England, 1992.
- 8 N. Caiden and A. Wildavsky, *Planning and Budgeting in Poor Countries*, John Wiley, New York, 1974.
- 9 N. Hicks and Ann Kubisch, *Finance and Development*, 1984, pp. 37-9.
- 10 Robert E. Looney, "Budgetary priorities in Saudi Arabia: the impact of relative austerity measures on human capital formation," *OPEC Review*, vol. 15, no. 2, summer, 1991, pp. 133-52.
- 11 Hicks and Kubisch, "Cutting government expenditures in LDCs."
- 12 See consistent argument by S.M. Miller and F.S. Russek in "Cointegration and error correction models: the temporal causality between government spending and taxes," *Southern Economic Journal*, June, 1990, pp. 221-9.
- 13 *Saudi Arabia Country Report*, Economist Intelligence Unit, London, 1996.
- 14 M.H. Pesaran and M. Pesaran, *Microfit 4.0: Interactive Econometric Analysis*, Camfit Dats, Cambridge, 1997.
- 15 Paul Aarts, "Saudi Arabia: from fiscal crisis to political crisis?," *JIME Review*, no. 29, summer, 1995, pp. 23-34; B. Beedham, "The cash-flow of God," *Economist*, vol. 332, August 6, 1994; J. Gerth, "Saudi stability hit by heavy spending over last decade," *New York Times*, August 22, 1993; G.F. Gause, *Oil Monarchies: Domestic Security Challenges in the Arab Gulf States*, Council on Foreign Relations, New York, 1994; Zanoian, "After the oil boom."